

**Affordable Learning Georgia Textbook Transformation Grants
Proposal Form**

Please complete per inline instructions; completed form not to exceed four pages.

Institution Name	Georgia Institute of Technology		
Team Members (Name, Title, Department and email address for each)	Young Mi Choi, Ph.D. Assistant Professor, School of Industrial Design, christina.choi@gatech.edu Cathy Carpenter Head, Architecture Library, College of Architecture cathy.carpenter@library.gatech.edu		
Sponsor, Title, Department	Jim Budd, Chair, School of Industrial Design		
Course Name, Course Number and Semester Offered (Spring 2015 Required)	Human Factors in Design ID 2320 Offered in Fall and Spring semesters (Next in Spring 2015)		
Average Number of Students in the Course	35-40	Number Course sessions per Academic year	2
Award Category (pick one)	X No-Cost-to-Students Learning Materials <input type="checkbox"/> OpenStax Textbooks <input type="checkbox"/> Course Pack Pilots		
List the original course materials for students (including title, whether optional or required, & cost for each item)	<p style="text-align: center;"><i>[Material Title, opt req]</i></p> 1. An Introduction to Human Factors Engineering – required 2. Set Phasers on Stun: And Other True Tales of Design, Technology, and Human Error	<p style="text-align: center;"><i>[Cost]</i></p> 1. \$170.00 2. \$22.00 <p style="text-align: center;">Total Cost: \$192.00</p>	
Projected Per Student Cost	\$192.00	Projected Per Student Savings (%)	100%

1. PROJECT GOALS

The main goals of this project will be to replace the course materials for the class Human Factors in Design (ID 2320) with materials that are freely available to students. It will also update the class activities and assignments as necessary to fit the new materials.

1.1 STATEMENT OF PROBLEM

Human Factors in Design (ID2320), is an introductory course to the subject human factors and ergonomics. Offered in both fall and spring semesters, it is a required course for a major or minor degree in Industrial Design. It is taken not only by Industrial Design students but also students from other disciplines (engineering, human computer interaction, etc). The main textbook used in this class is 'An Introduction to Human Factors Engineering' by Wickens, Lee, Liu and Becker. This is the most commonly used textbook for basic/introductory human factors classes (<http://www.hfes.org/Web/EducationalResources/textbooksmain.html>) It is often used in conjunction with the book 'Set Phasers on Stun' which provides many case examples of human factors related design problems and their consequences. These books, particularly 'An Introduction to Human Factors Engineering' is relatively expensive.

Though the texts are required and are very good references for the subject, some students will attempt to complete the course without purchasing the textbooks (due to expense or sometimes difficulty acquiring them). When this happens it negatively affects a students' ability to understand the topic. It also affects their ability to succeed in the class since assignments, quizzes, activities and exams are based on this material.

A solution to this problem would be to organize the course around materials that are freely available to the students. There are currently not any open textbooks that cover this subject. There are Open Educational Resources (OER) such as journal articles, books, government documents, videos and other references that cover the individual topics that are currently part of the class. The goal will be to identify these materials and gather them together to be used instead of the current textbooks in the Spring 2015 semester and in following semesters.

The obvious benefit to the students is reduced cost. There are additional benefits of being able to customize the text material. The flexibility to pick and choose specific educational materials that best teach the topic to be covered provides closer integration between the teaching materials and the class assignments and activities. Advancements in technology and best practices are constantly influencing Design practice. Selecting newer OER materials that are up-to-date and relevant will improve learning outcomes. The book "Set Phasers on Stun" still contains useful case studies. However, more current research is now available that could be included in the new textbook.

1.2 TRANSFORMATION ACTION PLAN

Replacement of text and update of syllabus

Any new set of materials must still be able to comprehensively cover each of the basic topics currently included in the class. These include:

- The history of human factors
- Basic research methods
- Design Evaluation methods
- Human senses (vision, auditory, tactile and vestibular systems)
- Human cognition and decision making
- Displays and control systems
- Anthropometry and body measurement
- Biomechanics of work
- Stress and workload
- Safety
- Human computer interaction and Automation

Replacement materials will need to be found for each of these topics in order to provide a comprehensive overview/explanation of the topic as well as a reference source for the students. The topics would likely still be covered in an order similar to the way that they are in the current course syllabus though some reorganization of the syllabus might be necessary to ensure that all of the new materials work well together.

Update of class activities and assignments

The next step will be to update assignments or class activities as needed. Currently, many classes have activities and quizzes related to the textbook readings. Some adjustments to these may be necessary. However since the in-class quizzes already cover many key learning points, the current ones might be used in evaluating the new materials to ensure that they do fully cover each topic to the required level of detail. Assignments may also be updated. There are currently 4 outside of class assignments that cover topics such as Task/Function Analysis, Design issues related to the senses and cognition, Population and Control Stereotypes, and Body Segment diagrams/application of anthropometric data. There is also final project (5th assignment) which integrates all of the topics covered through the semester. Each of these assignments may be tweaked or changed in order to more tightly integrate the learning activity with the way that the subjects are presented in the new materials.

Success Measures

There are several ways in which success might be measured. The primary objective measurement would be performance on quizzes and exams. Since the course should still cover the same topics, grades from exams and class quizzes should be comparable with previous classes. If the new materials are used in the Spring 2015 semester, there will be three previous semesters of the class to compare results to. Ideally the use of the new materials should enhance understanding of the subjects and lead to improvements in grades (particularly on the midterm and final exams). We can also compare student evaluations (which are collected at the end of each semester) to

previous classes.

1.3 TIMELINE

The basic timeline would be as follows:

October 2014:

- Identify potential materials that cover each topic currently included in the class
- Begin evaluation of the new materials to ensure that they fully cover the topic

November 2014:

- Complete evaluation of new materials.
- Identify any necessary updates to assignments, class activities or exams/quizzes

December 2014:

- Complete identified updates to assignments, class activities or exams/quizzes
- Update lecture and supporting class materials
- Update syllabus to include all new materials, assignments or changes to the order that topics are presented

1.4 BUDGET

Young Mi Choi	\$5000 – Time and salary for project activities
	\$400 – Travel for any required training for the project
Cathy Carpenter	\$5000 – Time and salary for project activities
	\$400 – Travel for any required training for the project

1.5 SUSTAINABILITY PLAN

The ID2320 class is offered every fall and spring semester. It is anticipated that the new materials will continue to be used for the class going forward. As normal with many classes, further development of the class is also expected. Things that do not work in practice as well as expected will be tweaked between offerings so that both the materials and presentation will continue to improve. Over time, newer materials which reflect the current state of the art can also be evaluated and included in future offerings of the course. The same success measures (course surveys, exam and class performance) can be used to evaluate changes to the course on an ongoing basis. Being able to customize teaching materials on a regular basis keeps the course fresh and current.

1.6 REFERENCES & ATTACHMENTS

Letter of support written by Jim Budd, Chair, School of Industrial Design, is included.